How Texture Drives Consumer Acceptance in Plant-Based Foods

This transcript has been lightly edited for clarity, readability, and length. The content reflects the original discussion and technical intent of the speakers.

Host:
Gabriela, thank you for joining me to talk about plant-based foods and how science helps make them more enjoyable.

Before we dive into the science, I'd love to learn more about you. What brought you into food science?

Dr. Gabriela Saavedra:
I always knew I wanted to work in biology. I initially studied bioengineering in Germany, thinking I would pursue pharmaceuticals or enzyme research. But I quickly realized I wasn't patient enough for that type of work.

I started exploring other applications of bioengineering and attended a lecture on food science and food technology. What resonated with me was the idea that food goes beyond hunger and nutrition—it plays a key role in society. Food is part of rituals, bonding, indulgence, and enjoyment. That helped me connect technical science with something deeply human and meaningful.

Host:
That's fascinating. So how did that path lead you to Thermo Fisher Scientific?

Dr. Gabriela Saavedra:
I've been an Application Specialist at Thermo Fisher Scientific for over three years, specializing in extrusion. Extrusion is a unit operation widely used in the food industry to create texture.

Texture is one of the most important sensory attributes consumers look for when purchasing food. Even if flavor is good, if a product doesn't crunch or feel right in the mouth, people won't buy it. I studied bioprocess engineering and later specialized in food process engineering, focusing on texture measurements and how food structures can be modified to create specific sensory experiences.

This connection between texture and consumer acceptance is what ultimately drew me to Thermo Fisher.

Host:
Texture is such a subjective experience. How do scientific instruments measure something that happens in the mouth?

Dr. Gabriela Saavedra:
Texture perception is actually a combination of three factors: visual appearance, handling, and oral processing. We judge texture by how food looks, how it behaves when we touch or spoon it, and how it responds when we bite and chew.

While it's difficult to define texture with a single attribute, every interaction involves force. When we chew or handle food, we apply force, and the food responds with resistance. That resistance is something we can measure objectively.

To validate these measurements, we still rely on sensory panels, but instrumentation allows food scientists to measure texture faster and more consistently without relying solely on subjective feedback.

Host:
One of the instruments you work with extensively is the rheometer. Can you explain what it does?

Dr. Gabriela Saavedra:
A rheometer measures the resistance and flow behavior of liquids and semi-solid materials. In food science, it helps us measure viscosity, deformability, and other textural properties.

Using different accessories, we can simulate chewing by compressing samples or mimicking interactions between the tongue and palate. This allows us to assess mouthfeel characteristics like creaminess, roughness, or lubrication.

For example, creamy foods typically lubricate well due to fats or proteins, while poorly homogenized products may feel sandy or rough. Rheometers also help measure gelling properties, which is especially important in low-fat products where viscosity needs to be compensated through formulation.

Host:
How does this apply specifically to plant-based foods?

Dr. Gabriela Saavedra:
Plant-based alternatives often struggle to replicate the lubricating properties of animal fats and proteins. For example, dairy alternatives are frequently perceived as too firm or sandy because they lack these natural characteristics.

In meat analogs, consumers expect juiciness and fibrous muscle-like structures. Through extrusion, we can create anisotropic structures from plant proteins that resemble muscle fibers. However, replicating intramuscular fat—like the marbling in a Kobe beef—is still a major challenge.

We've made great progress in structure, but fat distribution remains an area for improvement.

Host:
Do consumers really want plant-based products that mimic meat so closely?

Dr. Gabriela Saavedra:
Yes and no. Plant-based products are largely designed for flexitarians—people who eat meat but want to reduce consumption for environmental, ethical, or health reasons. These consumers still want the experience of meat.

That's why products like the Impossible Burger focus on mimicking cooking behavior, color changes, and sensory cues. However, cultural context matters. In many Asian cuisines, plant-based foods like tofu and tempeh already exist without needing to mimic meat.

In Western cultures, where diets are more meat-centric, alternatives help preserve food rituals and social bonding.

Host:
Culture doesn't always come up in scientific discussions. Is it something food scientists consider?

Dr. Gabriela Saavedra:
Not often enough. I've seen researchers, such as colleagues working in culturally diverse regions like California, design plant-based products tailored to specific cuisines. This approach resonates more with consumers because food is emotional and cultural, not just nutritional.

Plant-based foods won't succeed if they don't address these emotional and cultural needs.

Host:
Looking ahead, what food science trends should consumers and scientists watch?

Dr. Gabriela Saavedra:
Precision fermentation and cultivated meat are emerging trends, though they're still expensive and in early stages. Reconstructed dairy proteins produced without animals are also gaining attention.

Another important trend is nutrition for aging populations. As people live longer, we need nutrient-dense foods that are easy to consume. Encapsulation of vitamins and functional ingredients is becoming increasingly important to support healthy aging.

Food science is moving toward solutions that balance nutrition, convenience, and sensory appeal.

Host:
Thank you, Gabriela. This has been incredibly insightful.

Dr. Gabriela Saavedra:
Thank you for having me. I enjoyed the conversation.